of the whole matter is that, unconsciously, I have actually furnished important evidence in favour of your meteoric hypothesis.

Sincerely yours,
J. M. Schaeberle.

Some time after the arrival of the letter I received the number of the Publications of the Astronomical Society of the Pacific which contained the article referred to, which I have read with the greatest interest. It has been known for some time that Dr. Schaeberle has been able to reproduce the general appearance presented by the corona by means of mechanical contrivances, and that even the polar rays, which were such a noticeable feature of the eclipse of 1878, as I saw it at Separation, can be, in this way, satisfactorily accounted for.

The point of newest interest, however, is that referred to in Dr. Schaeberle's letter.

Assuming *eruptions* most active in the sun-spot zones, and an initial velocity of 380 miles a second, he obtains the following results:—

(1) All parts of a given unperturbed stream will be in a heliocentric latitude nearly equal to the latitude of the point of ejection.

(2) For a constant ejective force the periodic time t will be the same for all parts of the stream.

(3) The chance of collision of a returning with an outgoing stream varies inversely as the square of the distance of the point of collision from the sun.

(4) Near the sun, therefore, collisions must occur which tend to retard or stop the outgoing streams, resulting in a temporary increase in the heat of the combined colliding masses (causing a consequent increase in the brightness of the corona at such places, and at the same time rendering the coronal detail more confused). This heat will tend to be largely dissipated before such masses fall back into the sun, which they will then reach with comparatively small velocity and low temperature. Unretarded returning streams on striking the sun will tend to greatly raise the temperature at the points of impact: perturbed returning streams could, of course, strike all parts of the sun's surface. Unperturbed returning streams will always fall within the limits of the sun-spot zones.

(5) So long as the incoming streams are very numerous, the outgoing ones will, in a great measure, be stopped, so that, after the interval t, there will be comparatively few returning streams: a direct result of this state of things is to allow free passage for the outgoing streams, which, since there are now but few collisions, results in (1) an apparent diminution in the brightness of the corona, (2) more regular and sharply defined detail, and (3) in general a more uniformly illuminated solar surface might be expected, when there are but few or no returning streams. The periodic character of this intermittent motion can be well illustrated by means of a fine vertical jet of water. The vertical vibratory motion of a light ball, often to be seen in water fountains, is also a good illustration.

(6) If the ejective force is such as to make t about five years, a complete cycle of changes will take place in the time $2t$, and after the same manner as is observed in the sun-spot cycle. It is rather remarkable that the aphelion distance of the streams corresponding to this value of t is nearly the same as Jupiter's distance from the sun; so that the perturbations produced by this planet may have more to do with the regularity of the period than the assumed constant force of ejection. The initial velocity required to just carry a particle from the sun to Jupiter is but little less than a parabolic velocity. For an initial parabolic velocity, Saturn, alone considered, would, on the same hypothesis, cause a complete cycle of less marked changes in twenty years, Uranus in sixty years, and Neptune in one hundred and twenty years. The comparatively insignificant planets inside of the orbit of Jupiter would cause minor variations, corresponding to cycles, which, even for Mars, would be of less than two years' duration.

(7) The chance of the earth passing through one of these outgoing streams, which have a mean latitude of 15°, is less than it is for an incoming perturbed stream.

(8) A phenomenon similar to the observed zodiacal light would result from the projection of many such streams in space, and the observed extent of this light proves that the matter which causes this illumination extends to greater distances from the sun than the earth's distance.

It is evident from the foregoing that the complete statement which is to appear shortly will be looked forward to with interest.

For myself, I am glad to think that the views I put forward in the concluding chapter of my "Chemistry of the Sun" will now be looked at from a new point of view. Time will show what the "falls" which take the first place in my scheme, and the second in Dr. Schaeberle's, really are. Certainly I have seen no cause lately to alter the view I expressed in 1887, that the primary cause of solar disturbance is the *descent* of matter on to the photosphere.

J. Norman Lockyer.

NOTES.

On Monday the Prince of Wales presented the Albert Medal of the Society of Arts to Mr. W. H. Perkin, "for his discovery of the method of obtaining colouring matter from coal tar, a discovery which led to the establishment of a new and important industry, and to the utilization of large quantities of a previously worthless material"; and to Sir Frederick Abel, "in recognition of the manner in which he has promoted several important classes of the arts and manufactures by the application of chemical science, and especially by his researches in the manufacture of iron and steel, and also in acknowledgment of the great services he has rendered to the State in the provision of improved war material and as Chemist of the War Department." The medal awarded to Mr. Perkin was for the year 1890; that to Sir Frederick Abel was for the present year.

We are glad to hear that in consequence of the deputation which waited upon Sir Michael Hicks-Beach on June 5, the Board of Trade have registered the British Institute of Preventive Medicine as a limited liability company, with the omission of the word "limited."

It seems as if the introduction of large engineering views may soon produce a very marked effect upon the future of Egypt. Mr. Willcocks, one of the Inspectors of Irrigation, has communicated an interesting letter to the *Times*, from which we select the following remarks on the engineering importance of Dongola:—"The summer supply of the Nile is lamentably deficient for the existing cotton and sugar-cane crops of Egypt, so that all extensions of these valuable crops are out of the question under existing conditions. The Nile Valley in Nubia is eminently suited for storage of water, but up to the present all projects for storing the muddy flood waters of the Nile below the junctions of the Blue Nile and the Atbara have been condemned, as the construction of solid dams would have resulted in the silting up of the reservoirs themselves. This difficulty has disappeared now that it has been discovered that open dams can be constructed which will allow the muddy flood waters to flow through, and store the clear winter supply for use in summer. The construction of these dams has been rendered possible by the great success of Stoney's patent roller-gates, which can be worked under heads of 70 feet of water on a scale sufficient to pass the full flood supply of the Nile. At any time now Egypt can construct a reservoir in its own territory by building an open dam at the head of the Assouan Cataract. If, however, Egypt were allowed to occupy the Nile Valley as far as Dongola, the reach of the river above the Wady Halfa Cataract would provide the necessary reservoir, and the Philæ immersion difficulty would be at an end. So far the summer supply needed for Egypt proper. If the Soudan itself is to be developed, it will only be necessary to construct solid dams at the heads of the Ripon Falls and Fola Rapids, and thus secure the Victoria and Albert Nyanza Lakes as magnificent reservoirs. These reservoirs would not only secure Egypt and the Soudan from drought, but would also, if provided with open dams, secure Egypt from excessive floods. The White Nile as it leaves the two lakes is a clear stream, so that the silting up of the reservoirs would be out of the question, leaving alone their great size."

We very cordially congratulate Sir G. B. Airy (the ex-Astronomer-Royal), on the completion of his ninetieth year. A distinguished company assembled at the White House, Greenwich Park, on Saturday last, in honour of the occasion.

Prof. Adalbert Krueger, Director of the Observatory of Kiel, has been appointed Prof. Schönfeld's successor at Bonn.

Dr. Felix has been appointed professor in the University of Leipzig.

The Council of the Yorkshire College, Leeds, have appointed Mr. V. Perronet Sells, New College, Oxford, to be Extension Lecturer in Science.

A project is in the air for the erection of an Observatory on Mont Blanc. M. Janssen made an appeal last year for support in this undertaking, and on Monday at the Academy of Sciences he announced that his appeal had been heard. He has obtained the support of M. Bischoffsheim, Prince Roland Bonaparte, Baron Alfred de Rothschild, member of the Academy of Fine Arts, and M. Eiffel.

The annual meeting of the Institution of Mechanical Engineers was opened on Tuesday at Liverpool.

Sanitary science has, during the last month, lost one of its pioneers, in the person of Dr. John Sutherland, whose record of work in the domain of sanitation since 1848 has been of a marvellous character. In 1848 he entered the public service under the first Board of Health, and continued to be employed under the Home and Foreign Offices till the year 1855. During this time he conducted several special inquiries—notably one into the cholera epidemic of 1848–49, which is even now frequently referred to. He was the head of a commission sent to various foreign countries to inquire into the law and practice of burial. He represented the Foreign Office at the International Conference, held at Paris in 1851–52, for regulating quarantine law. In 1855 he was engaged at the Home Office in bringing into operation the Act for abolishing intramural interments, a task which he had undertaken at the request of Mr. Walpole. He was also doing duty in the reorganized General Board of Health, under the presidency of Sir Benjamin Hall, when, at the request of Lord Palmerston and Lord Panmure, he became the head of the commission sent out to inquire into the sanitary condition of our troops engaged in the Crimean War. He found in Miss Florence Nightingale a devoted coadjutor in regard to the hospitals. Dr. Sutherland took an active part in the preparation of the report of the Royal Commission (of which he was a member) on the sanitary state of the Army, dated 1858, and also of the report of the Royal Commission on the sanitary state of the Army in India, dated May 19, 1863. Both of these were of vast importance to the welfare of our soldiers, and most of the recommendations contained therein have been carried out. One of these was the appointment of the Barrack and Hospital Improvement Commission, with Mr. Sidney Herbert, M.P., as President, and Captain (now Sir Douglas) Galton, Dr. Burrell, of the Army Medical Department, and Dr. Sutherland as members. By this committee every barrack and hospital in the United Kingdom was visited, and its sanitary condition reported upon. Defects were brought to light and remedied, and the health of the troops consequently much improved. Subsequently Dr. Sutherland and Captain Galton visited and made similar reports on the Mediterranean Stations, which at that time included the Ionian Islands. All these reports were presented to Parliament, and a reference to them will show the vastness of the work undertaken. In 1862 the Barrack and Hospital Improvement Commission was reconstituted, and all sanitary reports were submitted to the committee and reviewed by them, and suggestions for improving Indian stations prepared. This continued up to the time of Dr. Sutherland's retirement, on June 30, 1888. In 1865 he again visited Gibraltar and Malta, and made an independent and special report on the outbreak of epidemic cholera at those places. In 1866, Dr. Sutherland. in conjunction with Mr. R. S. Ellis, of the Indian Civil Service, Dr. Joshua Paynter, of the Army Medical Department, and Major (now Lieutenant-General, C.B.) Ewart, R.E., visited Algeria, and reported on the causes of reduced mortality in the French army serving in that country, with a view to seeing what of the conditions in force there would be applicable to Her Majesty's troops serving in India and other warm climates. The value of the recommendations made by him and his colleagues will be better understood by a comparison between the vital statistics of the army prior to the time of the Crimean War and those of the present date than in any other way.

Mr. Willoughby Smith, who had played an important part in connection with submarine telegraphy, died on July 17. He was born in 1828, and in 1848 entered the service of the Gutta-Percha Company, and superintended the manufacture and laying of the first submarine cable. The *Times* gives the following account of his subsequent career. In 1864 the Gutta-Percha Company became merged in the Telegraph Construction and Maintenance Company, and Mr. Smith remained with the company as chief electrician and manager of the gutta-percha works until his retirement through failing health in 1887. In 1866 he was electrician-in-charge, being on board the *Great Eastern* during the laying of the first successful Atlantic cable, and the recovery and completion of the cable that had been lost the year before. Mr. Smith was President of the Institution of Electrical Engineers in 1883, before which Society, as well as before the Royal Institution, he read many interesting and valuable papers. Amongst these was one on his discovery of the effect of light on the electrical quality of selenium, and another on his researches in volta and magneto-electric induction.

Mr. Daniel Mackintosh, F.G.S., died at Birkenhead last week at an advanced age. He was the author of a work on "The Scenery and Geology of England and Wales," and his researches on certain traces of the glacial epoch were well known to geologists. In recognition of his services to geological science, the Geological Society presented him in 1886 with a grant from the Lyell Fund.

Mr. Edward Stanford has published a pamphlet on "The Spread of Influenza: its Supposed Relations to Atmospheric Conditions," by the Hon. R. Russell. The following are some of the author's conclusions as to the conditions which give rise to influenza, and permit it to be spread. Influenza is a disease caused by exceedingly minute microbes, arising from extensive areas of marsh or sodden land in Central Asia, China, or Siberian. The minuteness of the microbes or their spores is shown by their easy transmissibility, and the large number of persons capable of being infected by a single case in a large room, most persons probably requiring many virulent organisms to be inhaled in a short time before the resistant power of the blood is overcome. This microbe, like that of cholera, multiplies with great rapidity, and probably soon produces sufficient poison to terminate its career in the body, but not before multitudes of spores or microbes have been given off by the breath. Given the original conditions of rainfall, soil, and high temperature, the certain result is the development of inconceivable multitudes of microbes and spores; one species of these is capable of planting itself and living in the tissue and blood of man, of which the temperature is probably near that to which it has been accustomed under the summer sun in wet and drying ground. The somewhat rare and occasional visitations of influenza may be due to at least two or three causes—first, the occurrence of unusual rainfall and favourable summers; second, the prevalence of air-currents from the drying area towards inhabited places; third, adequate communication between these infected places and the towns of Russia, whence progress is rapid towards Western Europe. The wind has no influence that can be verified in the transportation of influenza. As for the means of prevention, Mr. Russell thinks that measures of disinfection and isolation of the earliest cases, and rules at ports and landing places similar to those employed against cholera, would probably prove of the greatest service. Inland, every locality should isolate and disinfect its first cases.

Prof. Langley, the Director of the Smithsonian Institution, is now in this country. *A propos* of his recent researches, referred to in our last number, we learn that Mr. Maxim is building a "flying machine," with which a series of experiments is contemplated; it is now being constructed at Crayford, and is nearly ready for launching. It will be propelled by a light screw making 2500 revolutions a minute. The motive power (it is reported) is supplied by a petroleum condensing engine weighing eighteen hundred pounds, and capable of raising a forty thousand pound load. The real suspending power will lie in an enormous kite measuring 110 feet long and 40 feet wide.

The following passage occurs in the Report of the Medical Officer of Health of the parish of St. George, Hanover Square, for the five weeks ending July 4, 1891:—"I have calculated the death-rate of the parish for the past month on the census population of 1881, and not on that of 1891, for the following reasons:—The census population of the parish in 1871 was 89,758, and that in 1881 was 89,573; I have no reason to believe that there was any serious inaccuracy in either of these enumerations, so that the population of the parish was practically stationary during the ten years from 1871 to 1881. The enumerated population in 1891 was only 78,362, showing an apparent decrease of 11,211 (or one-eighth of the population) since 1881. I know of no reason whatever for any such decrease, and do not believe it has taken place. The census was taken of the persons sleeping in the parish on the night of Sunday, April 5, a day which had two serious disadvantages, the first being that it was a Sunday, a day on which many people in this parish are out of town, and the second that it was the Sunday after Easter, and that large numbers of people had not returned to town from their Easter holidays. *I therefore consider that the enumeration of the population of the parish this year is of no value for statistical purposes*, and in estimating the birth-rates and death-rates, shall continue to use the census population of 1881, until a fresh and more correct enumeration shall have been made, which will, I hope, be in 1896." This is rather serious. What have our census authorities to say on the matter?

An earthquake was experienced at Evansville, Indiana, on the 26th inst. The shock was so great as to create a panic in several places of worship. Considerable damage was done to property. The direction of the oscillations was from north to south.

The weather prospects in the North-West Provinces seem to be improving. Beneficial rains have commenced to fall, and a famine is therefore less probable than it was. The distress among the ryots is, however, great, and the Government of India has voted a grant of £10,000 for their relief. The following telegram was read by Sir J. Gorst, on Tuesday night, in the House of Commons:—"There is an improvement in agricultural prospects and development of monsoon season. There has been good general rainfall throughout the country, except in part of Madras, the Carnatic, and Upper Burmah, in consequence of which there is no present cause of anxiety in Northern India. Strong monsoon blowing West Coast. More rain imminent in Punjab and Rajpootana, where fodder famine has been arrested by rain. Crop operations in Northern India generally progressing satisfactorily, and there is no present cause for anxiety in North-West Provinces and Oude."

The Technical Education Committee of the Kent County Council has placed £3000 at the disposal of the South-Eastern Counties Association for the Extension of University Teaching, for courses of lectures suited to agricultural and rural populations in small towns and villages throughout the country.

The Accademia delle Scienze dell' Istituto di Bologna offers a gold medal of 1000 lire value (about £40), the Aldini Prize, "to the author of a memoir which, based on certain data of chemistry, or physics, or applied mechanics, shall indicate new and really practical systems or new apparatus for prevention or extinction of fires." The memoirs may be manuscripts in Italian, Latin, or French (with inclosed name and motto), or printed matter published between May 11, 1890, and May 10, 1892. In the latter case, the memoir may be in another language than those named, but an Italian translation must be added. The date-limit is May 10, 1892.

The most recent addition to Prof. Flower's excellent series of specimens illustrative of zoological structure placed in the entrance-hall of the Natural History Museum is a set of nineteen dissections prepared by Mr. G. Ridewood to illustrate the variations in the deep plantar tendons of the bird's foot. With the help of these preparations, the student will have little difficulty in understanding the mysteries of the *flexor longus hallucis* and the *flexor perforans digitorum*, upon which two muscles, as has been shown by Sundeval, Garrod, and Forbes, so much depends in the classification of birds.

It would seem that the present interest in agricultural instruction comes none too soon. The *Agricultural Gazette* of New South Wales gives an account of a new industry—the export of butter to this country, and adds that the Minister of Mines and Agriculture has approved of the establishment of a travelling dairy to impart instruction to the settlers in relation to it.

The same number contains articles on the grasses and weeds of the colony, and notes on economic plants and weeds, besides information of what some people consider as of a more "practical" character, touching profitable cows and pigs.

The utilization of waste products is the order of the day. An interesting article on this subject, in relation to breweries, in the *Brewers' Guardian*, calls attention to the utilization of the carbonic acid gas produced in the fermentation of sugar. "On an average, English beer may be considered to contain 5 per cent. of alcohol, and as, in the fermentation of sugar, the weight of carbonic acid produced is almost the same as that of alcohol (the exact proportions being 48·9 of carbonic acid to 51·1 of alcohol), there must have been 500,000,000 pounds of carbonic acid produced in our breweries. The specific gravity of carbonic acid is 0·1524, and therefore a simple calculation shows that the above weight is equal to 25,000,000,000 gallons—a volume it is almost impossible to realize; such a volume would require a space one mile square and forty yards high to contain it. It is now proposed to utilize the greater portion of this large quantity of carbonic acid. The process by which this is to be done has been tried for some little time past in St. James's Gate (Guinness's) Brewery, Dublin; and Sir Charles A. Cameron has reported very favourably on it. The following are the conclusions at which he arrives after a most careful examination of the process:—(1) An immense quantity of carbonic acid is produced in breweries, and is at present wasted; (2) a large proportion of this gas could be condensed to liquid at a cost not exceeding ½*d.* per pound, but probably less than ¼*d.* per pound; (3) the process of liquefying the gas is successfully carried on at Guinness's Brewery, Dublin; (4) the liquefied gas prepared at Guinness's Brewery is perfectly free from any peculiarity of flavour or odour; (5) the carbonic acid produced at soda-water works costs about 4*d.* per pound; (6) it is safer, and in every way more desirable, to use in beverages carbonic acid derived from a food substance, such as grain, than from mineral sources; (7) the uses of liquid carbonic acid are numerous, important, and increasing."

AMONG the plants shown at the meeting of the Royal Botanic Society on Saturday last was a museum specimen of one which had lately died in the Gardens—a victim to the late severe winter. This was one of several specimens of the East Indian or white mangrove, *Avicennia nivea*, sent to the Gardens by the late Duke of Buckingham when Governor of Madras. For some years past these plants had flourished amazingly, thanks to the near approximation to their natural condition attained by keeping them in a very wet state and watering only with sea-water. Under these circumstances they threw up from the roots a number of offsets, or upright adventitious roots, of from 10 inches to 12 inches high, and half an inch thick. In a space of 2 feet square as many as eighty appeared, looking like so many rakes standing up out of the water, and keeping as near as possible the same height above the surface. The only explanation, so far, has been that offered by the Secretary, Mr. Sowerby. In its native state the trees form a fringe along the sea-shore and estuaries of great tropical rivers, lining the banks with a dense and impenetrable mass of vegetation, pushing itself further and further into the river or sea, and leaving behind the dry land it has reclaimed. In such a position these curious rootlets must be an immense advantage to the plant, enabling it to retain all the *débris* washed to the sides, and at the same time preventing the soil between the roots from being carried away by floods, &c. The plants of this species now growing in the Gardens are the only ones alive in this country.

A MOST interesting report of a journey taken along the frontier of the British Protectorate of Nyassaland by Mr. J. Buchanan, C.M.G., Acting Consul at Nyassa, appears in the *Kew Bulletin* for July.

FROM the *Meteorological Observations at Sydney* for January 1891, just received, we learn that the temperature was 2° higher, the humidity 2·4 less, and the rainfall 0·87 inch greater than that of the same month on an average of the preceding thirty-two years.

THE Indian Government has just issued a "Contents and Index of the first twenty volumes of the Records of the Geological Survey of India, 1868–87." Considering the important work done by this Survey, the index will be of great value to geologists. It consists of 118 pages.

THE pamphlet entitled "A Summary of the Darwinian Theory," which was noticed in a recent issue (July 16, p. 247), has been printed for private distribution. The author, Mr. Pascoe, will supply a copy to any person interested in the subject on application to him at 1 Burlington Road, W.

A NEW and cheaper edition of the translation of vol. i. of Weismann's "Essays upon Heredity and Kindred Biological Problems" is announced for immediate publication by the Clarendon Press; and we understand that vol. ii. is in the press, and will consist of four additional essays, and a preface by Prof. Weismann.

Petermann's Mitteilungen for July contains an article on Zante, with an original map, based on the English Admiralty chart, by Prof. Partsch.

AN official notice has been issued concerning the charitable foundation instituted by the Sisters Froelich at Vienna for subsidizing persons distinguished in science, art, or literature. Pensions and donations are to be granted to duly approved applicants. Applications should be addressed to the Trustees (das Curatorium), and transmitted to the President's office of the Common Council of the City of Vienna (an das Präsidialbüreau des Wiener Gemeinderathes Neues Rathaus) before August 31, 1891, through the I. and K. Austro-Hungarian Embassy in London, 18 Belgrave Square, S.W., where particulars of the terms and conditions of the foundation deeds, &c., can be obtained.

FURTHER details concerning the new volatile compound, iron carbonyl, $Fe(CO)_4$, are published by Messrs. Mond and Quincke in the current number of the *Berichte*. It appears that as early as November last year they succeeded in volatilizing small quantities of iron in a stream of carbon monoxide, and recovering it again in the form of a metallic mirror by passing the gaseous product through a heated tube. The best results are given when the iron is obtained by reduction of ferrous oxalate in a stream of hydrogen at as low a temperature as possible, very little exceeding 400° C., and allowing to cool in the stream of hydrogen to 80°. When carbon monoxide is led over the finely divided iron thus obtained, the issuing vapours are found to colour a Bunsen burner pale yellow; and if they are passed through a glass tube heated to a temperature between 200° and 350°, a mirror of metallic iron is deposited. If the tube is heated to a temperature superior to 350°, instead of a mirror a black flocculent deposit is obtained, containing carbon in addition to iron. The metallic mirror dissolves readily in dilute acids, and the solutions give all the reactions of iron. A quantitative analysis was made of one such mirror, and yielded almost theoretical numbers for pure iron. The black flocculent deposit was found in two cases to contain 79·30 and 52·78 per cent. of carbon respectively. The reaction, however, proceeds only very slowly. To give some idea of this, Messrs. Mond and Quincke state that after six weeks continued treatment of twelve grams of iron with carbon monoxide only about two grams had been volatilized. As the action becomes very slight indeed after treatment for some hours, the operation was interrupted at the end of every five or six hours, and the iron reheated to 400° in a stream of hydrogen, after which the reaction proceeded again as at first. It is calculated that the average amount volatilized was about two cubic centimetres per litre of carbon monoxide. This great dilution has of course rendered it very difficult to ascertain the composition and properties of the substance. Its composition has, however, been determined by absorbing the vapour obtained during eight to sixteen hours in mineral oil of boiling-point 250°–300°, which after numerous experiments has been found to be the best solvent for it, and heating the solution thus obtained to 180°, when it becomes black owing to the separation of metallic iron, and carbon monoxide is evolved. Determinations of the amount of separated iron and the volume of carbon monoxide obtained in five such experiments gave for the proportion of molecules of CO to one atom of iron the numbers 4·14, 4·03, 4·15, 4·26, and 4·04 respectively. Hence there can be very little doubt that the compound is represented by the formula $Fe(CO)_4$, analogous to the nickel compound obtained last year, $Ni(CO)_4$. As regards the relation of the compound to the processes of iron and cementation steel manufacture, the authors are of opinion that, although they have been unable to prepare it at temperatures between 150° and 750°, still it is quite possible that it may be momentarily formed at such temperatures, but again immediately dissociated.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. G. Stevenson Macfarlane; a White-fronted Capuchin (*Cebus albifrons*) from South America, presented by the Earl of Carnarvon; a Silver-backed Fox (*Canis chama* ♂) from South Africa, presented by Mr. Max Michaelis; a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. J. Smalman Smith; two Rough Foxes (*Canis rudis*) from British Guiana, presented by Mr. G. H. Hawtayne, C.M.Z.S.; two Pennsylvanian Buzzards (*Buteo pennsylvanicus*) from North America, presented by Sir Walter Hely Hutchinson; a Barn Owl (*Strix flammea*), British, presented by Mr. E. Hart, F.Z.S.; a Tigrine Cat (*Felis tigrina*), two Spotted Cavies (*Cœlogenys paca*), a White-lipped Peccary (*Dicotyles labiatus*), a Red and Yellow Macaw (*Ara chloroptera*), a Blue and Yellow Macaw (*Ara ararauna*), two Orange-winged Amazons (*Chrysotis amazonica*), two West Indian Rails (*Aramides cayennensis*), a Martinique Gallinule (*Ionornis martinicus*) from South America, a Golden Agouti (*Dasyprocta aguti*), three Crested Curassows (*Crax alector*) from Guiana, a Hawk-headed Parrot (*Deroptyus accipitrinus*), a Common Trumpeter (*Psophia crepitans*) from Demerara, deposited; an Azara's Agouti (*Dasyprocta azaræ*) from South Brazil, purchased.

OUR ASTRONOMICAL COLUMN.

OBSERVATIONS OF SUN-SPOTS AND FACULÆ.—*Comptes rendus* for July 13 contains the results of observations of sun-spots and faculæ, made by M. Marchand, at Lyons Observatory, during the first six months of this year. The following table expresses, in millionths of the sun's visible hemisphere, the surface covered by spots and faculæ during this period.

1891.	Surface covered by spots.	Surface covered by faculæ.
January	385	12·5
February	503	20·7
March	265	15·9
April	726	25·4
May	670	22·1
June	968	29·7
Total	3517	126·3

These figures demonstrate the increase in solar activity which must have been noted by all observers. The total spotted area of 3517 millionths is made up by 65 groups. During the whole of 1890 the spotted area given by 43 groups was only 3760 millionths. Since the end of March not a single day has passed without a spot being seen on the sun. With regard to distribution, 40 groups have appeared in the northern hemisphere as against 25 in the south. These occurred most frequently between the latitudes ± 20° and ± 30°. At the same time 22 groups have had latitudes between 10° and 20° (with four groups below 15°), thus indicating an approach to the equator.

The measures of faculæ give similar results. The two zones from 20° to 30° are the richest, and those from 0° to 10° the poorest. The total numbers are sensibly the same in both hemispheres. There is, however, a slight superiority in relative number in the northern hemisphere, but less marked than during 1890. The total surface covered by faculæ in 1890 was 103·3 millionths of the sun's visible disk, so that the figures now given indicate a considerable augmentation. It is also worthy of note that the results obtained for spots and faculæ show a certain parallelism, secondary minima in March and in May occurring in each case.

STARS HAVING PECULIAR SPECTRA.—In a communication to *Astronomische Nachrichten*, No. 3049, Prof. Pickering notes that a Group II. star situated in Sagittarius (R.A. 19h. 51·8m., Decl. − 42° 7′, 1900), having exhibited bright hydrogen lines in its photographic spectrum, was suspected of the variability of which this appearance is a characteristic. Measures of photographs of the star taken on different dates proved that the supposition was a correct one, and indicated a variation between the magnitudes 9·1 and 13·1.

The photographic spectrum of the star S.D. − 12°·1172 (R.A. 5h. 22·9m., Decl. − 12° 46′), mag. 9·2, appears to be the same as that of a planetary nebula as regards the positions of lines, but it differs in the interesting fact that the H_β hydrogen line (F) is unusually strong in comparison with the nebula line at λ 500.

Two more stars having spectra mainly consisting of bright lines, like the three stars in Cygnus discovered by Wolf and Rayet, have been discovered. They are Cord. G. C., 15·934h. (R.A. 15h. 15·9m., Decl. −62° 20′, 1900), and a faint star in the position R.A. 13h. 36·3m., Decl. − 66° 55′ (1900). The number of stars of the Wolf-Rayet type is thus brought up to thirty-five.

THE INSTITUTION OF NAVAL ARCHITECTS

THE first London summer meeting of the Institution of Naval Architects was held on Thursday, Friday, and Saturday of last week. During the thirty-one years that the Institution has existed, it has only held five summer meetings. The first of these was in Glasgow, and was highly successful, but it was not followed by another summer meeting until the year 1886, when the attractions of the Liverpool Exhibition were sufficient to cause the Council to arrange a second meeting for that year in the second city of the kingdom. The Newcastle and Glasgow Exhibitions followed in the two succeeding years, and the members accordingly were summoned to the banks of the Tyne and Clyde. All these meetings were successful in every respect, not only in adding to the membership of the Institution, but in the valuable papers contributed to the Transactions, and the interest of the various excursions. In spite of this, no summer meeting was held either in 1889 or 1890, in which years there were but the single three days' meeting in the spring. That has been conclusively proved not to be sufficient time for the conduct of the business of the year; and at the last spring meeting it was announced that in future two meetings would be held every year—the first to be the usual spring meeting, which always takes place in London, and the second to be held in the summer, either in London or elsewhere. The success of the meeting just held strongly supports the wisdom of this decision.

There was naturally not so long a list of papers on the programme as there is at the spring meeting, for allowance had to be made for the excursions. With the latter we are compelled to deal very briefly on account of pressure on our space, and we will therefore say a few words upon them at once, before proceeding to notice the papers. On the first day, Thursday, the 23rd inst., the afternoon was devoted to the Royal Naval Exhibition, and in the evening there was a dinner, at which Lord Brassey presided, the absence of the President, Lord Ravensworth, being caused by a domestic sorrow. On the Friday afternoon the excursion was to the shipyard of Samuda Brothers, at Poplar, and to the Thames Ironworks at Blackwall. The P. and O. Company also gave a luncheon, in the Albert Docks, on board the *Carthage*. At Samudas' the two second-class cruisers H.M.SS. *Sappho* and *Scylla* are in course of construction, and give quite a welcome air of bustle and activity to the Poplar yard, not long since a scene of what many thought to be permanent stagnation. These ships are 3400 tons each, and 9000 indicated horse-power. A large amount of armour-plate bending and machinery is now going on in this yard, and the machine tools were examined with much interest by many of those members to whom such work was new. At the Thames Ironworks there are also two ships in progress for the Royal Navy. These are the cruisers *Grafton* and *Theseus*. The latter name brings up stirring memories of another noble ship built in years past at Blackwall. The new steel *Theseus* is,